State Board of Education Approved
February 2002

COMPUTER ARCHITECTURE

COURSE DESCRIPTION

This course is designed to allow students to develop work-related skills and prepare for certification in the computer architecture career path. Content provides students the opportunity to acquire knowledge and skill in both theory and practical applications pertaining to troubleshooting, replacing, installing, and upgrading computers. Procedures used in the course may be hardware oriented, software oriented, or programming oriented. Upon completion of the course, students will possess a thorough knowledge of modern personal computer architecture and be able to take the A + Certification exam.

Prerequisite: Information Technology Infrastructure
Algebra I or Math for Technology II (may be concurrent)

Recommended Credits: 1

Recommended Grade Level: 10^{th} or 11^{th}

COMPUTER ARCHITECTURE
STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will detect system problems through observation of system actions, report of error messages, and/or client requests.

3.0 Students will perform diagnostic operations or troubleshooting on software.

4.0 Students will perform diagnostic operations or troubleshooting on hardware.

5.0 Students will optimize memory in a computer.

COMPUTER ARCHITECTURE

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:

1.1 Exhibit positive leadership skills.
1.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction.
1.3 Assess situations and apply problem-solving and decision-making skills to particular client relations in the community and workplace.
1.4 Demonstrate the ability to work cooperatively with others in a professional setting.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

1.1 Demonstrates character, leadership, and integrity using creative and critical-thinking.
1.2.A Applies the points of the creed to personal and professional situations.
1.2.B Participates and conducts meetings and other business according to accepted rules of parliamentary procedure.
1.3.A Analyzes situations in the workplace and uses problem-solving techniques to solve the problem.
1.4.A Participates in a community service project.
1.4.B Assists with an officer campaign with Tennessee SkillsUSA-VICA.

SAMPLE PERFORMANCE TASKS

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Evaluate an activity within the school, community, and/or workplace and effects of the project.
- Implement an annual program of work.
- Prepare a meeting agenda for a SkillsUSA-VICA monthly meeting.
- Attend a professional organization meeting.
- Participate in the American Spirit Award competition with SkillsUSA-VICA.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program,* SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies

COMPUTER ARCHITECTURE

STANDARD 2.0

Students will detect system problems through observation of system actions, report of error messages, and/or client requests.

LEARNING EXPECTATIONS

The student will:

2.1 Create a table that relates observable symptoms to particular portions of the system.
2.2 Observe how faults in the system manifest themselves.
2.3 Evaluate a normal bootup sequence.
2.4 Perform customer service and administrative functions.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

2.1.A Evaluates keyboard-related symptoms.
2.1.B Evaluates video-related symptoms.
2.1.C Evaluates floppy disk drive-related symptoms.
2.1.D Evaluates hard disk drive-related symptoms.
2.1.E Evaluates CD-ROM drive-related symptoms.
2.1 F Evaluates mouse-related symptoms.
2.1.G Evaluates memory input/output (MI/O) function-related symptoms.
2.1.H Evaluates system board-related symptoms.
2.2.A Observes light flash and length of time the light is ON.
2.2.B Evaluates and records error messages on the monitor.
2.2.C Notes actions and indications of the system.
2.3.A Charts steps a system completes successfully.
2.3.B Calculates what steps should be taken if only step one is completed.
2.4.A Listens to the client describe the problem.
2.4.B Troubleshoots client problem(s).
2.4.C Maintains service records, including parts, warranty claims, shipping, and maintenance logs.

SAMPLE PERFORMANCE TASK

- The students observe instructor-placed faults in a computer system and transfer symptom information to a symptom chart.
- Eliminate subsystems associated with steps successfully completed and focus on subsystems related to the problem.
- Remove memory modules from the video card.
- Reset video adapter card.
- Clean and install various components.

INTEGRATION LINKAGES

Computer Skills, Internet Navigation Skills, Protocols, Language Arts, Foreign Language, Science, Math, Math for Technology, Social Studies, History, Government, Law, Electricity, Electronics, Criminal Justice, Research and Writing Skills, Communication Skills, Teamwork Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), SkillsUSA-VICA, CompTia, World Wide Web Consortium (W3C), Writers Guild (HWG), A-+ Certification

COMPUTER ARCHITECTURE

STANDARD 3.0

Students will perform diagnostic operations or troubleshooting on software.

LEARNING EXPECTATIONS

The student will:

3.1 Explore and implement the use of diagnostic programs such as CheckIt Sysinfo and Microsoft Diagnostics (MSD).
3.2 Execute diagnostic procedures for using software for hardware testing.
3.3 Analyze situations where diagnostic programs would be useful to a field technician.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

3.1.A Examines the configuration of computers using software.
3.1.B Documents the configuration of a system.
3.1.C Calculates means to eliminate hardware and software conflicts.
3.1.D Views software programs that are installed and eliminates or confirms software conflicts.
3.2.A Establishes parameters for a working computer system.
3.2.B Uses software diagnostic packages to evaluate system performance.
3.2.C Differentiates between a software and a hardware problem.
3.3.A Develops test procedures for a nonworking computer system.
3.3.B Evaluates the performance of a system.
3.3.D Isolates sources of the problem.

SAMPLE PERFORMANCE TASKS

- The students will diagnose several instructor-placed system defects, isolate the sources of the problems, and correct them.
- Save/restore CMOS settings to/from disk.
- Collect configuration information.
- Calibrate a joystick.
- Configure a system for automatic virus detection.
- Detect any virus infections.
- Produce reports of the result of a test.
- Install diagnostic software on the hard drive for use in latter procedures.
- Brainstorm and reach consensus on solutions as indicated by the diagnostic procedures.

INTEGRATION/LINKAGES

Computer Skills, Internet Navigation Skills, Protocols, Language Arts, Foreign Language, Science, Math, Math for Technology, Social Studies, History, Government, Law, Electricity, Electronics, Criminal Justice, Research and Writing Skills, Communication Skills, Teamwork Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), SkillsUSA-VICA, CompTia, World Wide Web Consortium (W3C), Writers Guild (HWG), A-+ Certification

COMPUTER ARCHITECTURE

STANDARD 4.0

Students will perform diagnostic operations or troubleshooting on hardware.

LEARNING EXPECTATION

The student will:

4.1 Explore and implement the use of diagnostic programs such as PC-Check.
4.2 Execute diagnostic procedures on hardware.
4.3 Explore and implement diagnostic modules using power-on shelf test (POST) cards.
4.4 Troubleshoot the system's operations.
4.5 Analyze problems that do not present apparent symptoms.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

4.1.A Establishes parameters for a working computer system.
4.1.B Develops a testing procedure for a nonworking computer system.
4.1.C Implements a software package to evaluate system performance.
4.2.A Completes tests on serial port(s), floppy disks drive(s), hard-disk drive(s), parallel port(s), system board components, memory, and video operation(s).
4.2.B Views the report on completed tests.
4.2.C Differentiates between burn-in tests and standard diagnostic tests.
4.2.D Interprets diagnostic flow charts.
4.3.A Plugs in power-on shelf test (POST) cards into the system's expansion bus.
4.3.B Creates a QBASIC program to test the parallel printer port of the MI/O adapter.
4.3.C Creates a QBASIC program to test the system's DMA channels.
4.4.A. Develops logical steps for isolating system board problems.
4.4.B Locates components associated with the operations of the system board.
4.4.C Documents types of symptoms created by system board problems.
4.5 Develops a methodical procedure to analyze problems that do not manifest symptoms.

SAMPLE PERFORMANCE TASK

- The student will troubleshoot, using diagnostic software, a system on which the instructor has placed several defects or faults; isolate the problem sources; and correct them.
- Conduct motherboard RAM and ROM tests.
- Conduct keyboard tests.
- Conduct a serial communications card test.
- Conduct a monitor test.
- Conduct a graphics table test.
- Isolate system problems and interrupt channel conflicts and DMA problems.
- Remove damaged components from bus.
- Apply **a or the** component exchange method to correcting actual system board problems.

INTEGRATION LINKAGES

Computer Skills, Internet Navigation Skills, Protocols, Language Arts, Foreign Language, Science, Math, Math for Technology, Social Studies, History, Government, Law, Electricity, Electronics, Criminal Justice, Research and Writing Skills, Communication Skills, Teamwork Skills, Leadership Skills, Secretary's Commission on Achieving Necessary Skills (SCANS), SkillsUSA-VICA, CompTia, World Wide Web Consortium (W3C), Writers Guild (HWG), A + Certification

COMPUTER ARCHITECTURE

STANDARD 5.0

Students will optimize memory in a computer.

LEARNING EXPECTATION

The student will:
5.1 Evaluate available RAM memory and make a decision as to installing additional RAM in an advanced architecture system.
5.2 Configure hardware, CMOS, and software to use additional memory.
5.3 Evaluate a system's performance.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
5.1.A Confirms RAM size.
5.1.B Selects modules of RAM to be installed.
5.1.C Installs memory modules.
5.2.A Resets system board memory size selection switches.
5.2.B Records memory configuration information.
5.3.A Observes system response to additional RAM.
5.3.B Creates a memory test report.
5.3.C Records performance test information.

SAMPLE PERFORMANCE TASK

- Record memory test information.
- Update the CONFIG.SYS file to use RAMDrive.
- Display the amount and use of the system's memory.
- Record the system's performance.
- Complete a case study on memory optimization and present to the class.

INTEGRATION LINKAGES

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